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EXAMINER	
JAMAL, ALEXANDER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/703,264	Applicant(s) THI ET AL.	
	Examiner Alexander Jamal	Art Unit 2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4,5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claim 1** rejected under 35 U.S.C. 102(b) as being anticipated by Eppler Jr. et al. (5600714).

a. **Claim 1:** Eppler discloses an echo canceller comprising an adaptive filter and coefficients adapted to cancel an echo in a near end signal (input waveform at terminal 38 in Fig. 1) from a far end signal (output waveform at terminal 36 in Fig. 1) (Col 6 lines 18-36). The echo comprises a portion of the near end signal from microphone 12 and a portion of a secondary audio signal (from white noise generator 78).

b. **Claim 2:** Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36).

c. **Claim 3:** Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51).

d. **Claim 6:** Eppler's input to echo canceller 46 (Fig. 1) is coupled to amplifier 72 which inherently contains a buffer for the purpose of protecting the input of the filter. The first and second audio signals are combined and fed to the echo canceller input via the buffer (amplifier 72).

e. **Claim 8**: In Eppler's echo canceller (Fig. 1), the adaptive filter generates an echo estimate of the combined primary and secondary signals (the microphone 12 signal, and white noise generator 78 signal). The cancellation of the echo in the near end signal is a function of the estimated echo (Col 6 lines 37-51).

f. **Claim 9**: Eppler's echo canceller further comprises difference operator 44 (Fig. 1) to subtract the echo estimate from the near end (input waveform at terminal 38 in Fig. 1) signal (Col 6 lines 37-51).

g. **Claim 10**: In Eppler's echo canceller the output of difference operator 44 (Fig. 1) is fedback to the echo canceller as an error signal for filter adaptation (Col 4 lines 20-39) (Col 6 line 65 to Col 7 line 16)

h. **Claim 11:** Eppler discloses an echo canceller comprising an adaptive filter and coefficients adapted to cancel an echo in a near end (output waveform at terminal 36 in Fig. 1) signal (Col 6 lines 18-36). The echo comprises a portion of the far end input waveform at terminal 38 in Fig. 1 (Acoustic echo) and an electrical echo (the near end signal echoing into the far end signal).

i. **Claim 12:** In Eppler's echo canceller, the acoustic echo comprises a portion of a secondary audio signal (from white noise generator 78) that is broadcast by speaker 58 (Fig. 1) and received by microphone 12.

j. **Claim 14:** In Eppler's echo canceller, the electrical echo comprises a portion of the far end (input at terminal 38 in Fig. 1) signal. The portion being picked up by microphone 12 and then echoing form terminal 36 back onto terminal 38.

k. **Claim 15:** Eppler's input to echo canceller 46 (Fig. 1) is coupled to amplifier 72 which inherently contains a buffer for the purpose of protecting the input of the filter. The first and second audio signals are combined and fed to the echo canceller input via the buffer (amplifier 72).

l. **Claim 17:** In Eppler's echo canceller (Fig. 1), the adaptive filter generates an echo estimate of the combined primary and secondary signals (input at terminal 38 in Fig. 1, and white noise generator 78 signal). The cancellation of the echo in the near end signal is a function of the estimated echo (Col 6 lines 37-51).

m. **Claim 18:** Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36).

n. **Claim 19:** Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51).

o. **Claim 20:** Eppler's echo canceller further comprises difference operator 20 (Fig. 1) to subtract said echo estimate from the near end (output waveform at terminal 36 in Fig. 1) signal (Col 6 lines 37-51).

p. **Claim 22:** Eppler discloses a data transmission system comprising:

i. A first telephony device that is inherent to a telephone system for the purpose of providing an interface to a user that desires to use the telephone system.

ii. A second telephony device comprising microphone 12 and speaker 58 (Fig. 1) that is coupled to the first telephony device via terminals 36 and 38.

iii. An adaptive filter and coefficients adapted to cancel an echo in a near end (output waveform at terminal 36 in Fig. 1) signal (Col 6 lines 18-36). The echo comprises a portion of the far end input waveform at terminal 38 in Fig. 1 (Acoustic echo) and an electrical echo (the near end signal echoing into the far end signal).

q. **Claim 23:** In Eppler's data transmission system, the second telephony device comprises a secondary audio signal (from white noise generator 78) that is broadcast by speaker 58 (Fig. 1) and a portion of which is received by microphone 12.

r. **Claim 25:** In Eppler's echo canceller, the electrical echo comprises a portion of a far end (input at terminal 38 in Fig. 1) signal. The portion being picked up by microphone 12 and then echoing form terminal 36 back onto terminal 38.

s. **Claim 27:** Eppler's input to echo canceller 46 (Fig. 1) is coupled to amplifier 72 which inherently contains a buffer for the purpose of protecting the input of the filter. The first and second audio signals are combined and fed to the echo canceller input via the buffer (amplifier 72).

t. **Claim 28:** In Eppler's echo canceller (Fig. 1), the adaptive filter generates an echo estimate of the combined primary and secondary signals (input at terminal 38 in Fig. 1, and white noise generator 78 signal) (Col 6 lines 37-51).

u. **Claim 29:** Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36).

v. **Claim 30:** Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51).

w. **Claim 31:** Eppler's echo canceller further comprises difference operator 20 (Fig. 1) to subtract said echo estimate from the near end (output waveform at terminal 36 in Fig. 1) signal (Col 6 lines 37-51).

x. **Claim 33:** Eppler discloses a method of canceling an echo having multiple audio components comprising the steps of:

i. Combining a primary signal (input waveform at terminal 38 in Fig. 1) and secondary audio signal (from white noise generator 78).

ii. Adaptively filtering the combination of the primary and secondary signals (echo canceller 24 in Fig. 1)

iii. Subtracting the echo estimate from a near end signal (output waveform at terminal 36 in Fig. 1) (Col 6 lines 37-51).

y. **Claim 36:** In Eppler's method, the adaptive filtering of the reference signal comprises generating an estimate of the echo as a function of the transfer function of the electrical (terminals 36, 38 Fig. 1) and acoustical (microphone 12 and speaker 58) echo paths (Col 6 lines 18-37).

z. **Claim 37:** Eppler discloses an echo canceler having multiple audio components comprising:

i. Combining means (buffer 76 in Fig. 1) for a primary signal (input waveform at terminal 38 in Fig. 1) and secondary audio signal (from white noise generator 78).

ii. Filtering means (echo canceller 24 in Fig. 1) for adaptively filtering the combination of the primary and secondary signals.

iii. Subtracting means (summer 20 in Fig. 1) to subtract the echo estimate from a near end signal (output waveform at terminal 36 in Fig. 1) (Col 6 lines 37-51).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claim 4** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 1 above, and further in view of Sih (5732134).

a. **Claim 4:** Eppler discloses applicant's echo canceller as per claim 1. However, Eppler does not teach the echo canceller comprising double talk logic to control the filter adaptation based upon speech in the near end signal.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path

estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) and cease coefficient adaptation in order to prevent the corruption of the echo path estimate.

5. **Claim 5** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 1 above, and further in view of Sellenslagh et al. (3433898).

a. **Claim 5:** Eppler discloses applicant's echo canceller as per claim 1. However, Eppler does not teach the secondary tone comprising a pulse metering tone.

Sellenslagh teaches that in certain telephony systems, it is desirable to generate pulse metering tones to increment call cost meters (Col 1 lines 29-47). It would have been obvious to one of ordinary skill in the art at the time of this application to include pulse metering as part of the terminal (and part of the secondary signal) for the purpose of controlling toll collection for services rendered to the user of the terminal.

6. **Claim 7** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claims 1 and 6 above, and further in view of Hasegawa (5905717).

a. **Claim 7:** Eppler discloses applicant's echo canceller as per claims 1 and 6. However, Eppler does not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down sample the primary signal, and also for the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

7. **Claim 13** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claims 11 and 12 above, and further in view of Isenburg et al. (5570295).

a. Claim 13: Eppler discloses applicant's echo canceller as per claims 11 and 12. However, Eppler does not teach the secondary audio signal being generated by a set-top-box.

Isenburg teaches a set-top-box (with a telephone interface) with a standard telephone interface will make it easier for a user to access the dial-in services advertised on the system (Col 4 lines 15-31). It would have been obvious to one of ordinary skill in the art at the time of this application to integrate the echo canceller with a set-top-box (with the two audio signals being the telephone signals and the cable signals) for the purpose of allowing easier access to advertised services.

8. **Claim 16** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Isenburg et al. (5570295) as applied to claims 11-15 above, and further in view of Hasegawa (5905717).

a. **Claim 16:** Eppler and Isenburg disclose applicant's echo canceller as per claims 11-15. However, they do not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down-sample the primary signal, and also for the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

9. **Claim 21** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 11 above, and further in view of Sih (5732134).

a. **Claim 21:** Eppler discloses applicant's echo canceller as per claim 11. However, Eppler does not teach the echo canceller comprising double talk logic to control the filter adaptation based upon speech in the near end signal.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) and cease coefficient adaptation in order to prevent the corruption of the echo path estimate.

10. **Claim 24** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claims 22 and 23 above, and further in view of Isenburg et al. (5570295).

a. **Claim 24:** Eppler discloses applicant's data transmission system as per claims 22 and 23. However, Eppler does not teach the secondary audio signal being generated by a set-top-box.

Isenburg teaches a set-top-box (with a telephone interface) with a standard telephone interface will make it easier for a user to access the dial-in services advertised on the system (Col 4 lines 15-31). It would have been obvious to one of ordinary skill in the art at the time of this application to integrate the data transmission system with a set-top-box (with the two audio signals being the telephone signals and the cable signals) for the purpose of allowing easier access to advertised services.

11. **Claim 26** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Isenburg et al. (5570295) as applied to claims 22-25 above, and further in view of Hasegawa (5905717).

a. **Claim 26:** Eppler and Isenburg disclose applicant's data transmission system as per claims 22-25. However, they do not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the

filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down-sample the primary signal, and also the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

12. **Claim 32** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 22 above, and further in view of Sih (5732134).

a. **Claim 32:** Eppler discloses applicant's data transmission system as per claim 22. However, Eppler does not teach the telephone device comprising double talk logic to control the filter adaptation based upon speech in the near end signal.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) and cease coefficient adaptation in order to prevent the corruption of the echo path estimate.

13. **Claim 34** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 33 above, and further in view of Hasegawa (5905717).

a. **Claim 34:** Eppler discloses applicant's method as per claim 33. However, he does not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator for the step of decimating the primary signal, and also the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the adaptive filter.

14. **Claim 35** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 33 above, and further in view of Sih (5732134).

a. **Claim 35:** Eppler discloses applicant's method as per claim 33. However, Eppler does not teach the telephone device comprising double talk logic to detect speech in the near end and controlling filter adaptation as a function of said detection.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) to perform the step of detecting speech in the near end and controlling filter

adaptation as a function of said detection adaptation in order to prevent the corruption of the echo path estimate during double talk.

15. **Claim 38** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 37 above, and further in view of Hasegawa (5905717).

a. **Claim 38:** Eppler disclose applicant's echo canceller as per claim 37. However, he does not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator for the step of decimating the primary signal, and also the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the adaptive filter.

16. **Claim 39** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) as applied to claim 37 above, and further in view of Sih (5732134).

a. **Claim 39:** Eppler discloses applicant's echo canceller as per claim 37. However, Eppler does not teach the canceller comprising double talk logic to detect speech in the near end and controlling filter adaptation as a function of said detection.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) to detect speech in the near end and controlling filter adaptation as a function of said detection adaptation in order to prevent the corruption of the echo path estimate during double talk.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

DUC NGUYEN
PRIMARY EXAMINER

AJ
October 30, 2003